

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 07-014489

(43)Date of publication of application : 17.01.1995

(51)Int.Cl.

H01H 50/56

H01H 50/02

(21)Application number : 05-155918

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(22)Date of filing : 25.06.1993

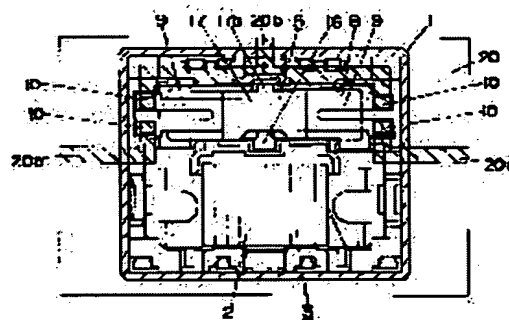
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## (54) HIGH FREQUENCY RELAY

### (57)Abstract:

PURPOSE: To improve isolation characteristics.

CONSTITUTION: The tip end section of a contact point spring 9 is branched, and each movable contact point 10 is fixedly attached to the faces faced to the printed board 20 of the branched sections. Each circuit pattern 20a and 20b which is brought in contact with/parted from the respective movable contact points 10, is formed in the printed substrates 20. Each aforesaid circuit pattern is formed into a so-called double-break structure, and less signals are made to jump in among the contact points, so that isolation characteristics are thereby improved.



## LEGAL STATUS

[Date of request for examination] 12.05.2000

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3322442

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[Date of registration] 28.06.2002

[Number of appeal against examiner's  
decision of rejection]

[Date of requesting appeal against  
examiner's decision of rejection]

[Date of extinction of right]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to a RF relay of balance amateur structure.

[0002]

[Description of the Prior Art] There are some which are shown in drawing 7 as a RF relay of the conventional balance amateur structure. The case 1 is constituted from body 1a and box-like covering 1b in which the inferior surface of tongue put on body 1a carries out opening by this high frequency relay. In body 1a, the central piece of the iron core 6 formed in the shape of an abbreviation KO character is looped around a coil (not shown) in the state of an insulation, the coil block 3 is formed, this coil block 3 is made into the side, and opening of an iron core 6 is sideways stored in it. A permanent magnet 4 is arranged between piece of both sides 6a of an iron core 6, both ends are made to counter piece of both sides 6a of an iron core 6, respectively, and the armature block 5 is arranged free [ rocking ] on the permanent magnet 4. To both ends, this armature block 5 forms in one the contact spring 9 which the traveling contact 10 fixed at an armature 8, and is constituted. From one flank of the center of the armature block 5, the piece of a hinge spring (9a, R> drawing 4 4 reference) which gives the force which is projected in one from the contact spring 9, and pulls apart the armature block 5 from an iron core 6 at the time of un-energizing [ of a coil ] is projected.

[0003] A permanent magnet 4 is a rectangular parallelepiped-like thing, both ends and a center section are magnetized by the unlike pole, and is infixed by adhesion etc. among piece of both sides 6a of the iron core 6 of the coil block 3, and is combined with the coil block 3 and one. The armature block 5 consists of an armature 8 made from magnetic material, a contact spring 9 made from electric conduction material, and a traveling contact 10 (refer to drawing 6 ). This RF relay is equipped with the contact terminal 13, a common terminal 14, and the end-winding child that does not illustrate, a stationary contact 11 fixes at the end of the contact terminal 13, the piece of a hinge spring is connected with the end of a common terminal 14, and a coil is connected to an end-winding child. And insert each terminal 13-15 to body 1a, it makes the other end hang caudad from body 1a, and is used as the terminal pin in the case of mounting in a printed circuit board.

[0004] The above-mentioned RF relay generates the magnetomotive force which pulls apart another side, and rotates an armature 8 focusing on the supporting-point section (refer to 17 of drawing 4 a) while it excites piece of both sides 6a of the iron core 6 as the magnetic pole section to a unlike pole and attracts one side of the both ends of an armature 8 according to the energization direction of the current to a coil. Thus, once piece of side 6a of an iron core 6 is adsorbed in an armature 8, even if it stops energization of a coil, the rotation condition of an armature 8 will be held with the magnetomotive force of a permanent magnet 4. And what is necessary is just to make the energization direction of a coil reverse, in making hard flow rotate an armature 8. Thus, when the traveling contact 10 which fixed for the contact spring 9 which rotates in one according to rotation of the rotating armature 8 contacts and opens alternatively to the stationary contact 11 on either side, a contact change-over is performed.

[0005] In addition, although the above explanation was explanation at the time of constituting a high frequency relay as a bistability mold, if energization of a coil is stopped by making the spring load characteristic of the contact spring 9 into imbalance etc., an armature 8 can also constitute it as a

monostable mold which carries out return rotation in the condition that a predetermined traveling contact 10 and a predetermined stationary contact 11 contact. By the way, in this kind of RF relay, to narrow spacing of a printed circuit board and a stationary contact 11 as much as possible, and to lessen leakage of a RF signal is desired. getting it blocked -- it is because a RF signal is revealed from the part between the printed circuit board of the contact terminal 13, and a stationary contact 11. In addition, in the above-mentioned high frequency relay, the base of body 1a becomes with the component side to a printed circuit board 20.

[0006] Since the armature block 5 and the permanent magnet 4 are installed beside the coil block 3 in the above-mentioned high frequency relay, a whole configuration is formed in a thin shape and spacing of a printed circuit board and a stationary contact 11 is narrow. However, in order to lessen leakage of a RF signal and to make a RF property good further, with the structure of the above-mentioned RF relay, it is difficult to make still narrower spacing of a printed circuit board 20 and a stationary contact 11. That is, since a traveling contact 10 fixes for the contact spring 9 of an armature 8 and one in the above-mentioned RF relay and the armature block 5 is laid on the permanent magnet 4, it is difficult to make the location of a traveling contact 10 still lower, and the location of a stationary contact 11 cannot be brought close to a printed circuit board side as a result.

[0007] Then, what is shown in drawing 8 is proposed. In this high frequency relay, body 1a of a case 1 is lost, and each configuration of the case 1 interior is stored in vertical reverse, and a stationary contact 10 is formed on the printed circuit board 20 which mounts the above-mentioned high frequency relay. In this case, since a stationary contact 10 is formed on a printed circuit board 20, a RF property is improved.

[0008]

[Problem(s) to be Solved by the Invention] By the way, this conventional kind of RF relay was the so-called one-point end structure of performing a contact change-over by closing motion with one traveling contact 10 and stationary-contact 1 <DP N=0003> 1, and moreover, since it was small, it had the problem that it was difficult to take the distance between contacts, and degradation of a RF property, especially the isolation property by the diving of the signal between the opened contacts arose.

[0009] The place which succeeds in this invention in view of an above-mentioned point, and is made into the purpose is to offer the RF relay which can acquire a good isolation property.

[0010]

[Means for Solving the Problem] The box-like case in which an inferior surface of tongue carries out opening in invention of claim 1 in order to attain the above-mentioned purpose, The coil block which loops the central piece of an abbreviation KO character-like iron core around a coil in the state of an insulation, is formed in it, carries out the direction of opening of an iron core sideways, and is contained in a case, The permanent magnet infixed between the pieces of both sides of the above-mentioned iron core, and the armature block which attach a contact spring in an armature in the state of an insulation at one, it is constituted, and the both ends of an armature are made to counter the piece of both sides of an iron core, respectively, and is arranged under the permanent magnet free [ rocking ], It has the printed circuit board attached in the form which blockades the inferior surface of tongue of a case, a traveling contact is fixed to the field which branches the point of a contact spring and counters the printed circuit board of each tee, and the circuit pattern which each traveling contact contacts and opens is formed in the above-mentioned printed circuit board.

[0011] In addition, in order to lessen many years past-degradation, as shown in claim 2, it is desirable to carry out the mold of the exterior of a case using the resin for the closures.

[0012]

[Function] Invention of claim 1 serves as the so-called two-point end structure which also opens the traveling contact of another side from the circuit pattern of another side, when one traveling contact dissociates from one circuit pattern as a stationary contact by constituting as mentioned above. Therefore, it becomes possible to lessen diving of the signal between contacts, and an isolation property becomes good.

[0013] By carrying out the mold of the exterior of a case using the resin for the closures, invention of claim 2 closes a RF relay and lessens many years past-degradation.

[0014]

[Example] One example of this invention is explained based on drawing 1 thru/or drawing 3 . A RF relay of this example is based on the conventional example of drawing 8 . getting it blocked -- body 1a of a case 1 is lost, and each configuration of the case 1 interior is stored in vertical reverse. In addition, since the basic configuration is the same as what was explained by drawing 7 , the same sign is attached about the same configuration and explanation of a configuration of overlapping is omitted.

[0015] As shown in drawing 3 , the armature block 5 of this example forms the synthetic-resin section 17 in the center section of the armature 8, inserts the contact spring 9 to this synthetic-resin section 17, and has unified and formed it in it. From the end side of the above-mentioned synthetic-resin section 17, supporting-point section 17a which supports the armature block 5 free [ rocking ] to a case 1 is protruded. The same of this point is said of the former. However, in the case of this example, the contact spring 9 on either side is separated, and the piece 16 of a hinge spring which was carrying out one-formation is also conventionally divided into the contact spring 9 in each contact spring 9. That is, it insulates in the synthetic-resin section 17 in each contact spring 9 and the piece 16 of a hinge spring. each contact spring 9 -- a tip -- two forks -- it branches to a \*\* and the traveling contact 10 is fixed at the tip of each piece of branching.

[0016] And in the case of this example, as shown in drawing 1 , the circuit patterns 20a and 20b on a printed circuit board 20 are used as a configuration corresponding to a stationary contact 10, the conventional contact terminal 13, and a conventional common terminal 14. Here, these circuit patterns 20a and 20b are formed so that it may contact [ a traveling contact 10 and ] and may open, respectively. Thus, if constituted, after the traveling contact 10 has opened from circuit pattern 20a as a stationary contact, a traveling contact 10 will open also from circuit pattern 20b of a common line side, and it will become the so-called two-point end structure. For this reason, if the distance from which a good isolation property is acquired in the distance of the part in contact with the traveling contact between circuit patterns is secured, it will become possible to acquire a good isolation property.

[0017] By the way, in the RF relay of one-point end structure it was explained by conventional drawing 8 that mentioned above, when improving a RF property further, as shown in drawing 4 or drawing 5 , stationary-contact 10 the very thing may be made to serve a double purpose by circuit pattern 20a of a printed circuit board 20. If it does in this way, the leakage of the RF signal from stationary-contact 11 the very thing can be lessened, and a RF property will be improved further.

[0018]

[Effect of the Invention] The coil block which an inferior surface of tongue loops around a coil the central piece of the box-like case which carries out opening, and an abbreviation KO character-like iron core in the state of an insulation, and is formed in it as mentioned above, and invention of claim 1 carries out the direction of opening of an iron core sideways, and is contained in a case, The permanent magnet infixed between the pieces of both sides of the above-mentioned iron core, and the armature block which attach a contact spring in an armature in the state of an insulation at one, it is constituted, and the both ends of an armature are made to counter the piece of both sides of an iron core, respectively, and is arranged under the permanent magnet free [ rocking ], It has the printed circuit board attached in the form which blockades the inferior surface of tongue of a case. Since the circuit pattern which fixes a traveling contact to the field which branches the point of a contact spring and counters the printed circuit board of each tee, and each traveling contact contacts and opens is formed in the above-mentioned printed circuit board When one traveling contact dissociates from one circuit pattern as a stationary contact, the traveling contact of another side can also be made into the so-called two-point end structure opened from the circuit pattern of another side, and, for this reason, decreases the diving of the signal between contacts, and an isolation property becomes good.

[0019] By carrying out the mold of the exterior of a case using the resin for the closures, invention of claim 2 can close a RF relay and can lessen many years past-degradation.

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CLAIMS

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[Claim(s)]

[Claim 1] The coil block which an inferior surface of tongue loops around a coil the central piece of the box-like case which carries out opening, and an abbreviation KO character-like iron core in the state of an insulation, is formed in it, carries out the direction of opening of an iron core sideways, and is contained in a case, The permanent magnet infixed between the pieces of both sides of the above-mentioned iron core, and the armature block which attach a contact spring in an armature in the state of an insulation at one, it is constituted, and the both ends of an armature are made to counter the piece of both sides of an iron core, respectively, and is arranged under the permanent magnet free [ rocking ], It has the printed circuit board attached in the form which blockades the inferior surface of tongue of a case. The RF relay characterized by forming in the above-mentioned printed circuit board the circuit pattern which fixes a traveling contact to the field which branches the point of a contact spring and counters the printed circuit board of each tee, and each traveling contact contacts and opens, and changing.

[Claim 2] The RF relay according to claim 1 characterized by carrying out the mold of the exterior of the above-mentioned case using the resin for the closures, and changing.

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the bottom view of one example of this invention.

[Drawing 2] It is a sectional view in the mounting condition to a printed circuit board same as the above.

[Drawing 3] It is the top view of an armature block.

[Drawing 4] It is the bottom view of the RF relay which has improved the RF property.

[Drawing 5] It is a sectional view in the mounting condition to a printed circuit board same as the above.

[Drawing 6] It is the top view of an armature block.

[Drawing 7] It is a sectional view in the mounting condition to the conventional printed circuit board.

[Drawing 8] It is a sectional view in the mounting condition to still more nearly another conventional printed circuit board.

[Description of Notations]

1 Case

3 Coil Block

4 Permanent Magnet

5 Armature Block

6 Iron Core

8 Armature

9 Contact Spring

10 Traveling Contact

16 Piece of Hinge Spring

20 Printed Circuit Board

20a, 20b Circuit pattern

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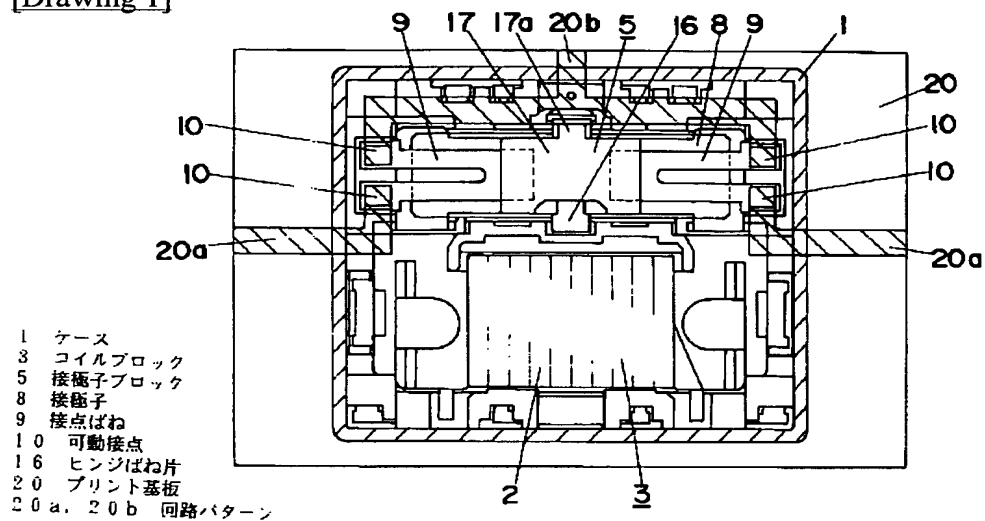
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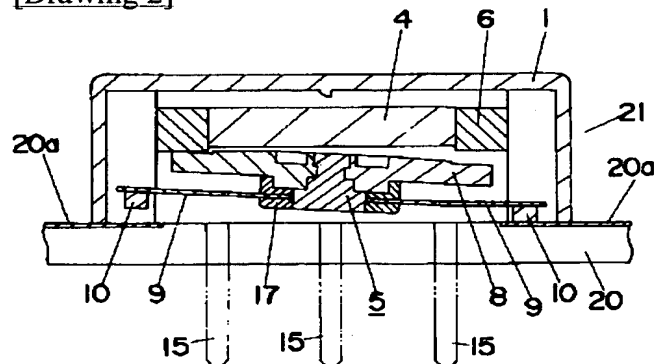
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## DRAWINGS

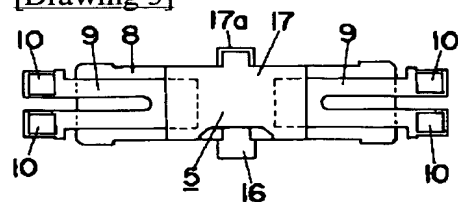
[Drawing 1]



[Drawing 2]

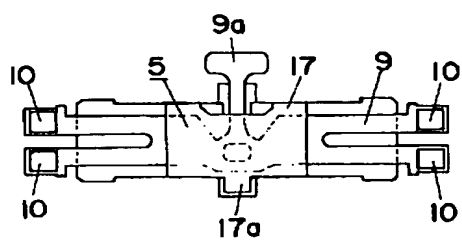


[Drawing 3]

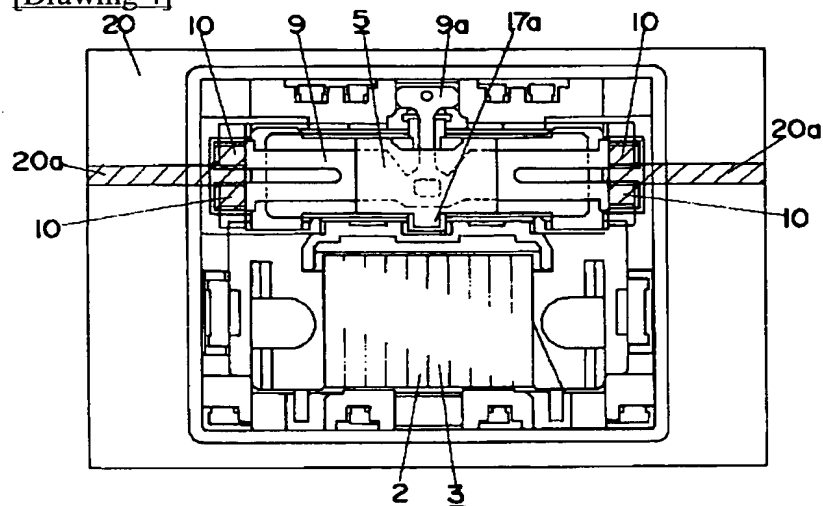


[Drawing 6]

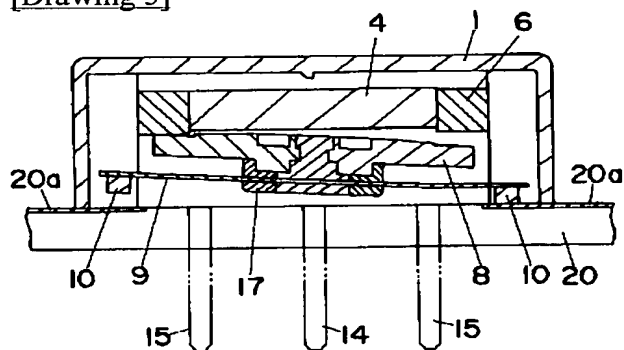




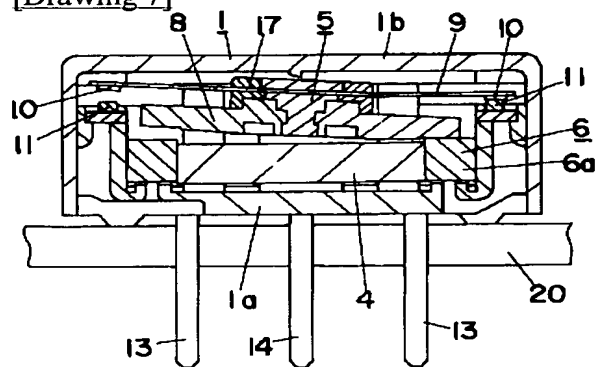
[Drawing 4]



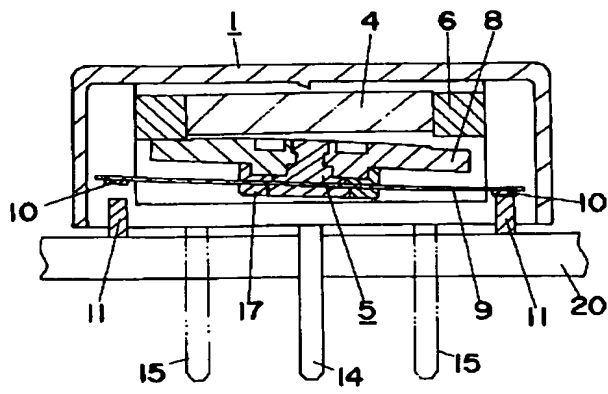
[Drawing 5]



[Drawing 7]



[Drawing 8]



[Translation done.]

(19) 日本国特許庁 (J P)

(12) 公開特許公報 (A)

(11) 特許出願公開番号

特開平7-14489

(43) 公開日 平成7年(1995)1月17日

(51) Int. CL <sup>1</sup>	識別記号	片内整理番号	P I	技術表示箇所
H 0 1 H 50/56		R 8121-5G		
50/02		N 8121-5G		

審査請求 未請求 請求項の数 2 O L (全 5 頁)

(21) 出願番号 特願平5-155918

(22) 出願日 平成5年(1993)6月25日

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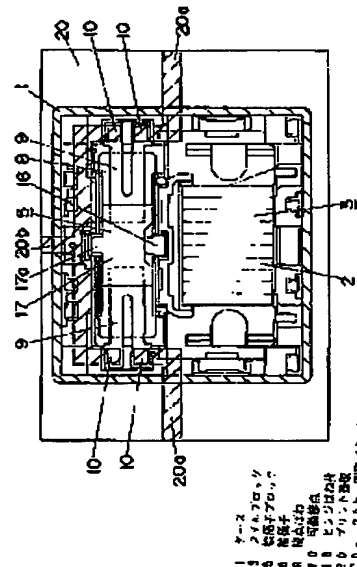
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(54) 【発明の名称】 高周波リレー

(57) 【要約】

【目的】 アイソレーション特性を改善する。

【構成】 接点ばね9の先端部を分岐して夫々の分岐部のプリント基板20に対向する面に可動接点10を固着する。夫々の可動接点10が接触、開離する回路パターン20a、20bをプリント基板20に形成する。いわゆる2点切り構造とし、接点間における信号の飛び込みを少なくし、アイソレーション特性を良好とする。



(2)

特開平7-14489

1

2

## 【特許請求の範囲】

【請求項1】 下面が開口する箱状のケースと、略コ字状の鉄心の中央片に絶縁状態でコイルを巻装して形成され鉄心の開口方向を偏向きにしてケース内に収容されるコイルブロックと、上記鉄心の両側片間に介装される永久磁石と、接点ばねを絶縁状態で接極子に一体に取り付けて構成され接極子の両端部を夫々鉄心の両側片に対向させて揺動自在に永久磁石の下方に配置される接極子ブロックと、ケースの下面を閉塞する形で取り付けられるプリント基板とを備え、接点ばねの先端部を分岐して夫々の分岐部のプリント基板に対向する面に可動接点を固着し、夫々の可動接点が接触、開離する回路パターンを上記プリント基板に形成して成ることを特徴とする高周波リレー。

【請求項2】 上記ケースの外部を封止用の樹脂を用いてモールドして成ることを特徴とする請求項1記載の高周波リレー。

## 【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、バランスアマチュア構造の高周波リレーに関するものである。

【0002】

【従来の技術】従来のバランスアマチュア構造の高周波リレーとしては図7に示すものがある。この高周波リレーでは、ボディ1aと、ボディ1aに接合される下面が開口する箱状のカバー1bとでケース1が構成されている。ボディ1a内には、略コ字状に形成された鉄心6の中央片に絶縁状態でコイル（図示せず）を巻装してコイルブロック3が形成され、このコイルブロック3を鉄心6の開口を側方にして偏向きに取り付けてある。鉄心6の両側片6aの間には永久磁石4を配置し、両端部を夫々鉄心6の両側片6aに対向させて永久磁石4上に揺動自在に接極子ブロック5を配置してある。この接極子ブロック5は、両端に可動接点10が固着された接点ばね9を、接極子8に一体的に形成して構成してある。接極子ブロック5の中央の側部からは、接点ばね9から一体的に突出されコイルの非通電時に接極子ブロック5を鉄心6から引き離す力を付与するヒンジばね片（9a、図4参照）を突出してある。

【0003】永久磁石4は、直方体状のもので、両端部と中央部とが異極に着磁されており、コイルブロック3の鉄心6の両側片6a間に接合などにより介装され、コイルブロック3と一体に組み合わされる。接極子ブロック5は、磁性材料製の接極子8と導電材料製の接点ばね9と、可動接点10とで構成されている（図6参照）。この高周波リレーは、接点端子13、共通端子14及び図示しないコイル端子を備え、固定接点11は接点端子13の一端に固着され、ヒンジばね片は共通端子14の一端に連結され、コイルはコイル端子に接続される。そして、夫々の端子13～15はボディ1aにインサート

し、他端部をボディ1aから下方に垂下させ、プリント基板に実装する場合の端子ピンとしてある。

【0004】上記高周波リレーは、コイルへの電流の通電方向に応じて、磁極部としての鉄心6の両側片6aを異極に励磁し、接極子8の両端部の一方を吸引すると共に、他方を引き離す起磁力を発生させ、接極子8を支点部（図4の17a参照）を中心に回動させる。このようにして、一旦鉄心6の側片6aに接極子8が吸着されると、コイルの通電を停止しても、永久磁石4の起磁力により接極子8の回動状態が保持される。そして、接極子8を逆方向に回動させる場合には、コイルの通電方向を逆にすればよい。このようにして回動される接極子8の回動に応じて一体的に回動する接点ばね9に固着された可動接点10が、左右の固定接点11に選択的に接触、開離することにより、接点切換が行われる。

【0005】なお、以上の説明は双安定型として高周波リレーを構成した場合の説明であったが、接点ばね9のばね負荷特性をアンバランスにするなどにより、コイルの通電を停止すると、所定の可動接点10と固定接点11とが接触する状態に接極子8が復帰回動する単安定型として構成することもできる。ところで、この種の高周波リレーにおいては、プリント基板と固定接点11との間隔を極力狭くし、高周波信号の漏洩を少なくすることが望まれる。つまりは、接点端子13のプリント基板と固定接点11との間の部分から高周波信号が漏洩するからである。なお、上記高周波リレーの場合にはボディ1aの底面がプリント基板20への実装面となる。

【0006】上記高周波リレーの場合には、接極子ブロック5及び永久磁石4をコイルブロック3の側に並置してあるので、全体形状が薄型に形成され、プリント基板と固定接点11との間隔は狭くなっている。しかしながら、高周波信号の漏洩を少なくしてさらに高周波特性を良好とするために、プリント基板20と固定接点11との間隔をさらに狭くすることは上記高周波リレーの構造では難しい。つまり、上記高周波リレーの場合には、可動接点10は、接極子8と一体の接点ばね9に固着される。接極子ブロック5は永久磁石4上に載置されているので、可動接点10の位置をさらに低くすることは難しく、結果的に固定接点11の位置をプリント基板側に近づけることができない。

【0007】そこで、図8に示すものが提案されている。この高周波リレーでは、ケース1のボディ1aを無くし、且つケース1内部の各構成を上下逆に収め、上記高周波リレーを実装するプリント基板20上に固定接点10を設けたものである。この場合には、固定接点10がプリント基板20上に設けられるため、高周波特性が改善される。

【0008】

【発明が解決しようとする課題】ところで、従来のこの種の高周波リレーは、1つの可動接点10と固定接点1

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1との開閉で接点切換を行ういわゆる1点切り構造であり、しかも小型であるため、接点間の距離をとることが難しく、高周波特性、特に開離した接点間における信号の飛び込みによるアイソレーション特性の劣化が生じるという問題があった。

【0009】本発明は上述の点に鑑みて為されたものであり、その目的とするところは、良好なアイソレーション特性を得ることができる高周波リレーを提供することにある。

【0010】

【課題を解決するための手段】請求項1の発明では、上記目的を達成するために、下面が開閉する箱状のケースと、略コ字状の鉄心の中央片に絶縁状態でコイルを巻装して形成され鉄心の開口方向を偏向きにしてケース内に収納されるコイルブロックと、上記鉄心の両側片間に介装される永久磁石と、接点ばねを絶縁状態で接端子に一体に取り付けて構成され接端子の両端部を夫々鉄心の両側片に対向させて揺動自在に永久磁石の下方に配置される接端子ブロックと、ケースの下面を閉塞する形で取り付けられるプリント基板とを備え、接点ばねの先端部を分岐して夫々の分岐部のプリント基板に対向する面に可動接点を固着し、夫々の可動接点が接触、開離する回路パターンを上記プリント基板に形成してある。

【0011】なお、経年的な劣化を少なくするために、請求項2に示すように、ケースの外部を封止用の樹脂を用いてモールドすることが好ましい。

【0012】

【作用】請求項1の発明は、上述のように構成することにより、一方の可動接点が固定接点としての一方の回路パターンから分離したとき、他方の可動接点も他方の回路パターンから開離するいわゆる2点切り構造となる。よって、接点間における信号の飛び込みを少なくすることが可能となり、アイソレーション特性が良好となる。

【0013】請求項2の発明は、ケースの外部を封止用の樹脂を用いてモールドすることにより、高周波リレーを封止して、経年的な劣化を少なくする。

【0014】

【実施例】図1乃至図3に基づいて本発明の一実施例を説明する。本実施例の高周波リレーは、図8の従来例を基本とするものである。つまりは、ケース1のボディ1aを無くし、且つケース1内部の各構成を上下逆に収めている。なお、基本構成は図7で説明したものと同じであるので、同一の構成に関しては同一の符号を付し、重複する構成の説明は省略する。

【0015】本実施例の接端子ブロック5は、図3に示すように、接端子8の中央部に合成樹脂部17を形成し、この合成樹脂部17に接点ばね9をインサートして一体化して形成してある。上記合成樹脂部17の一端面からは接端子ブロック5をケース1に対して揺動自在に支持する支点部17aを突設してある。この点は従来も

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同じである。但し、本実施例の場合には、左右の接点ばね9は分離され、且つ従来は接点ばね9に一体的形成していたヒンジばね片16も夫々の接点ばね9とは分離してある。つまり、各接点ばね9及びヒンジばね片16とは合成樹脂部17で絶縁されている。夫々の接点ばね9は、先端が二股状に分岐され、夫々の分岐片の先端に可動接点10が固着してある。

【0016】そして、本実施例の場合には、図1に示すように、従来の固定接点10、接点端子13及び共通端子14に対応する構成として、プリント基板20上の回路パターン20a、20bを用いてある。ここで、この回路パターン20a、20bは夫々可動接点10と接触、開離するように形成してある。このように構成すれば、固定接点としての回路パターン20aから可動接点10が開離した状態で、共通ライン側の回路パターン20bからも可動接点10が開離し、いわゆる2点切り構造となる。このため、回路パターン間の可動接点に接触する部分の距離を良好なアイソレーション特性が得られる距離を確保すれば、良好なアイソレーション特性を得ることが可能となる。

【0017】ところで、上述したように従来の図8で説明した1点切り構造の高周波リレーにおいて、さらに高周波特性を改善する場合には、図4あるいは図5に示すように、固定接点10自体をプリント基板20の回路パターン20aで兼用してもよい。このようにすれば、固定接点10自体からの高周波信号の漏れを少なくでき、さらに高周波特性が改善される。

【0018】

【発明の効果】請求項1の発明は上述のように、下面が開閉する箱状のケースと、略コ字状の鉄心の中央片に絶縁状態でコイルを巻装して形成され鉄心の開口方向を偏向きにしてケース内に収納されるコイルブロックと、上記鉄心の両側片間に介装される永久磁石と、接点ばねを絶縁状態で接端子に一体に取り付けて構成され接端子の両端部を夫々鉄心の両側片に対向させて揺動自在に永久磁石の下方に配置される接端子ブロックと、ケースの下面を閉塞する形で取り付けられるプリント基板とを備え、接点ばねの先端部を分岐して夫々の分岐部のプリント基板に対向する面に可動接点を固着し、夫々の可動接点が接触、開離する回路パターンを上記プリント基板に形成してあるので、一方の可動接点が固定接点としての一方の回路パターンから分離したとき、他方の可動接点も他方の回路パターンから開離するいわゆる2点切り構造とすることができ、このため接点間における信号の飛び込みを少なくなり、アイソレーション特性が良好となる。

【0019】請求項2の発明は、ケースの外部を封止用の樹脂を用いてモールドすることにより、高周波リレーを封止して、経年的な劣化を少なくすることができる。

【図面の簡単な説明】

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【図1】本発明の一実施例の底面図である。

\*【符号の説明】

【図2】同上のプリント基板への実装状態における断面図である。

1 ケース  
3 コイルブロック

【図3】接極子ブロックの平面図である。

4 永久磁石  
5 接極子ブロック

【図4】高周波特性を改善した高周波リレーの底面図である。

6 鉄心  
8 接極子

【図5】同上のプリント基板への実装状態における断面図である。

9 接点ばね  
10 可動接点

【図6】接極子ブロックの平面図である。

16 ヒンジばね片  
20 プリント基板

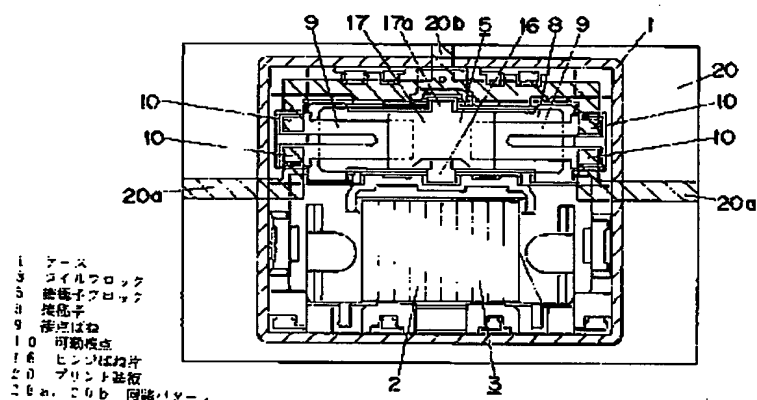
【図7】従来のプリント基板への実装状態における断面図である。

20a, 20b 回路パターン

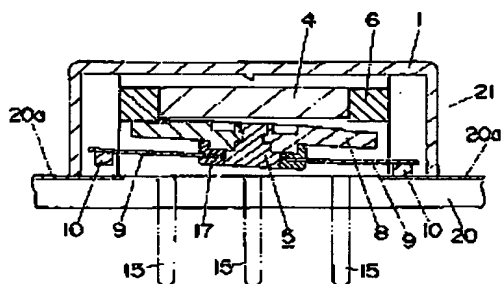
【図8】さらに別の従来のプリント基板への実装状態における断面図である。

\*

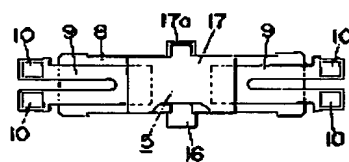
【図1】



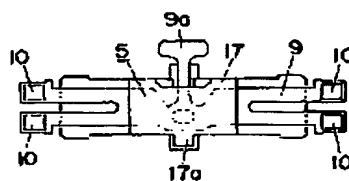
【図2】



【図3】



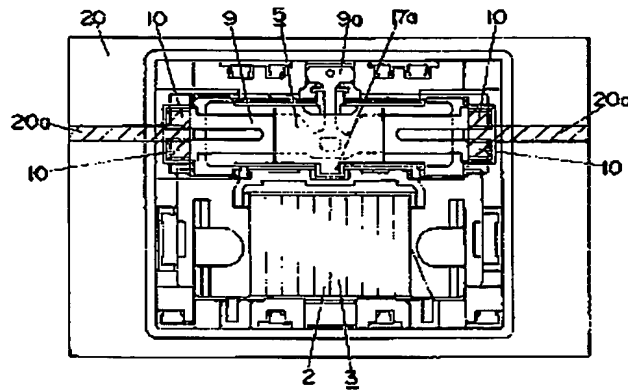
【図6】



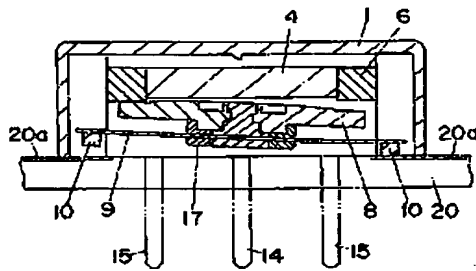
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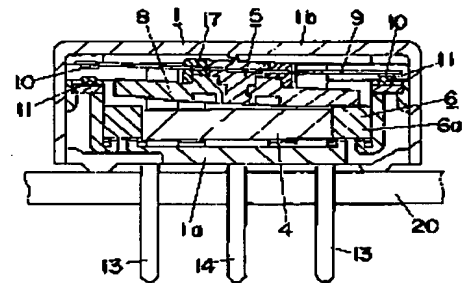
【図4】



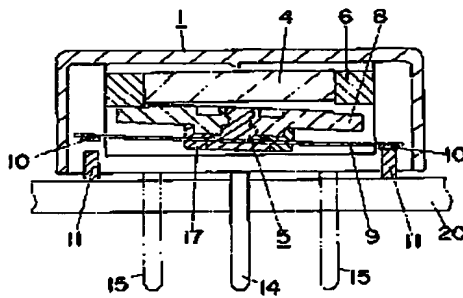
【図5】



【図7】



【図8】



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